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Case Report

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Synchronized AVNRT attack of mother and daughter: case report

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ABSTRACT

Atrioventricular nodal reentrant tachycardia (AVNRT) is a common arrhythmia and accounts for approximately 45-65% of paroxysmal supraventricular tachycardias. Patients may present with palpitations, syncope, dizziness, nausea, or sudden cardiac arrest. Although a few studies and case reports investigate the familial and genetic features of AVNRT, these mechanisms are unclear. This report aims to present the cases of a mother and her daughter who contributed to the emergency department with simultaneous AVNRT attacks and draw attention to the familial nature of AVNRT.

Keywords: Atrioventricular nodal reentrant tachycardia, arrhythmia, supraventricular tachycardia, familial

INTRODUCTION

Atrioventricular nodal reentrant tachycardia (AVNRT) is a common arrhythmia and accounts for approximately 45-65% of paroxysmal supraventricular tachycardias.[1] The average adult heart rate is 60-100 beats/min. However, in AVNRT, this rate is usually higher than 150/min. Patients may experience palpitations, dizziness, nausea and syncope. This can even lead to a sudden cardiac arrest.[2] While the frequency of AVNRT in the general population is estimated to be 1 in 1,000 people, the probability of occurrence in 2 family members reaches approximately 1 in 1,000,000 people.[3] It is known that fast and slow nodal reentry circles play a role in the mechanism of AVNRT and can be treated with radiofrequency ablation.[4] Many previous studies have reported that familial predisposition and genetic factors are effective in many structural heart diseases and supraventricular tachycardias such as wolf parkinson white (WPW) syndrome.[2,5]

However, few studies and case reports investigate the familial and genetic features of AVNRT.[1-6] This report aims to present the cases of a mother and her daughter who contributed to the emergency department with simultaneous AVNRT attacks and draw attention to the familial nature of AVNRT.

CASE

Case 1 - Mother

A 54-year-old female patient presented to the emergency department with a sudden onset of palpitations, dizziness and nausea. In the patient's medical history, it was found that she had had similar complaints on 3 or 4 previous occasions. However, she was not diagnosed with these conditions. The patient's vital signs were blood pressure: 130/80 mmHg, pulse rate 180/min, respiratory rate: 14/min and saturation: 97%. Other system examinations were normal. The patient's 12-lead electrocardiography (ECG) showed tachycardia, a narrow QRS complex, and a standard, rapid ventricular response. This ECG was evaluated as AVNRT (**Figure 1a**).

The patient was diagnosed with AVNRT with the electrophysiological study performed later. The patient was given 6 mg adenosine intravenously. The patient, who returned to sinus rhythm and no pathology was observed during follow-up, was discharged with recommendations (**Figure 1b**).

Case 2 - Daughter

A 19-year-old female patient came to the emergency department with her mother. She had no active complaints when she arrived. During the follow-up (probably due to emotional stress), palpitations, dizziness and weakness occurred. It was learned that the patient had previously received radiofrequency ablation treatment for AVNRT but had fewer attacks after treatment. Vital signs of the patient were blood pressure: 120/70 mmHg, pulse: 175/min, respiratory rate: 13/min, saturation: 97% was measured. Other system examinations were normal. ECG showed regular tachycardia with narrow QRS and rapid ventricular response. The patient's history and ECG findings were evaluated as AVNRT (**Figure 2a**).

The patient was given 6 mg adenosine intravenously. Sinus rhythm was obtained, no additional pathology was found during follow-up, and the patient was discharged with her mother with recommendations (**Figure 2b**).

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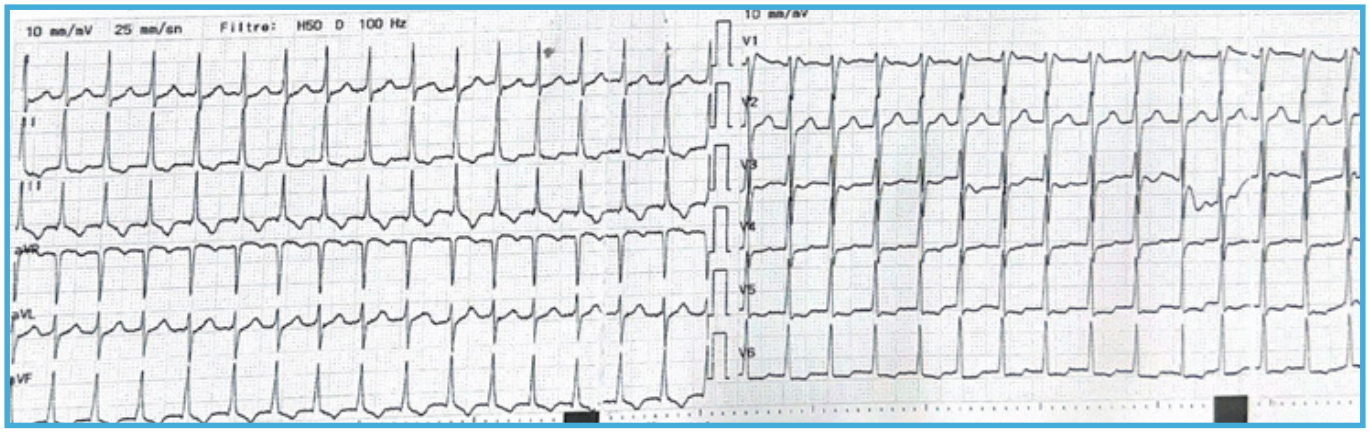

Figure 1a. Mother's 12 lead ECG: supraventricular tachycardia (probably AVNRT). Narrow rhytmic QRS complexes. Rate about 180. There is no P wave before QRS. There are P waves after QRS complexes at V1-3 leads

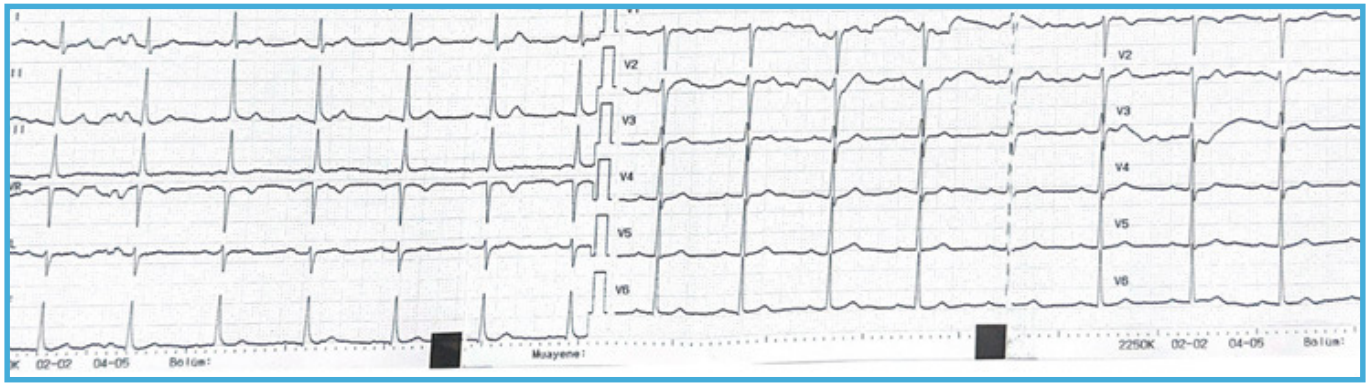

Figure 1b. Mother's second ECG after adenosine administration. It shows normal sinus ryhthm

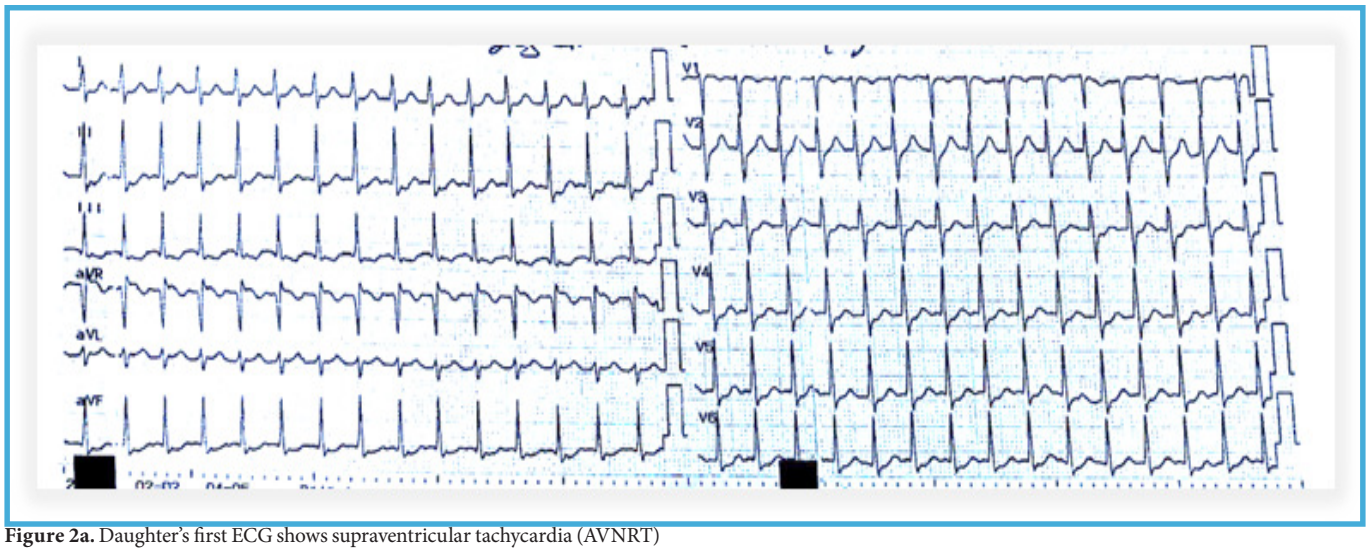

Figure 2a. Daughter's first ECG shows supraventricular tachycardia (AVNRT)

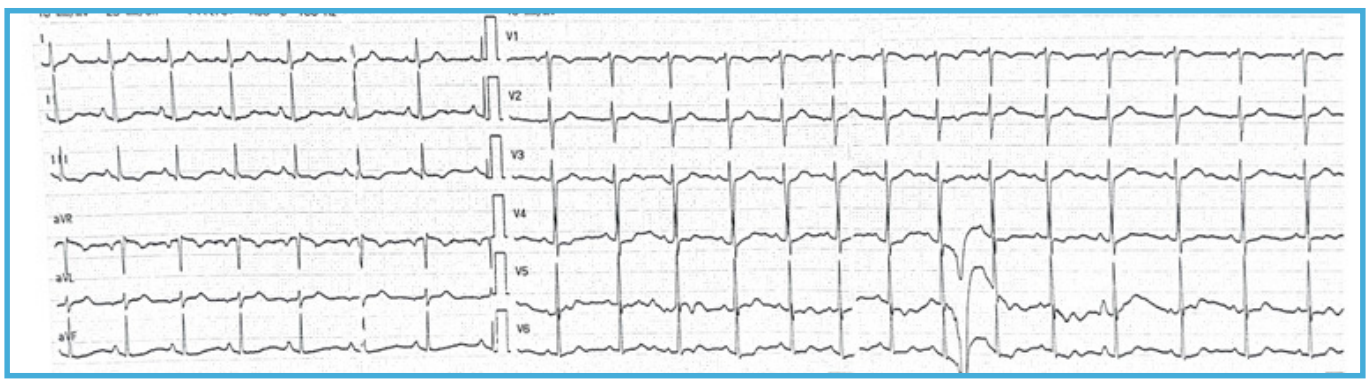

Figure 2b. Daughter's second ECG after adenosine administration

DISCUSSION

Until recently, paroxysmal supraventricular tachycardia caused by AV accessory pathways or dual AV node physiology was attributed to randomly occurring congenital anomalies of pathological substrates from birth.[7] Various responsible mutations in the autosomal dominant PRKAG2 gene have been identified for WPW syndrome, a common cause of supraventricular tachycardia.[8] However, the genetic and familial characteristics of AVNRT are not precise. There are limited studies and case reports on this subject in the literature.

A previous study conducted in Poland reported a familial relationship in 2.91%-4.02% of patients with AVNRT.[1] In another study conducted in 2022, the pathological gene was tried to be identified in sporadic and familial AVNRT cases. This article reports that three possible pathological genes (TRDN, CASQ2 and WNK1) may be responsible for domestic AVNRT cases.[2] Another study said that genes such as SCN1A, PRKAG2, RYR2, CFTR, NOS1, PIK3CB, GAD2 and HIP1R are probably responsible for AVNRT.[4] Further studies are needed to elucidate the genetic pathologies and familial characteristics responsible for AVNRT.

When the literature is reviewed, few case reports are related to familial AVNRT. The mother and son presented in 2012[6] who were diagnosed with ANVRT, and the father and two sons gave in 2017[7] can be shown among these. This case report mentioned a mother and her daughter diagnosed with AVNRT and presented to the emergency department with a simultaneous attack. This is the first case of familial AVNRT presenting with simultaneous attacks in the literature.

CONCLUSION

Although familial and genetic aspects are unapparent, this case report supports that AVNRT may be familial and genetic. It is important to remember that relatives of patients who present to the emergency department with an AVNRT attack may also have an AVNRT attack, which may be triggered by emotional stress. Additionally, genetic studies are needed to clarify the genetic and familial features of AVNRT.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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